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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/923,058	08/06/2001	David S. Becker	MCRO284--2/LWT	1840

7590

09/09/2004

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EXAMINER

GOUDREAU, GEORGE A

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/923,058	BECKER ET AL.	
	Examiner	Art Unit	
	George A Goudreau	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 30-123 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 30-123 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

George A. Goudreau
GEORGE GOUDREAU
PRIMARY EXAMINER

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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1. This action will not be made final due to the new grounds of rejection.
2. Applicant's arguments with respect to claims of record have been considered but are moot in view of the new ground(s) of rejection.
3. Claims 114, and 117 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

-Claims 114, and 117 unfairly broaden the scope of the claims upon which they depend.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 30-35, and 38-42 are rejected under 35 U.S.C. 102(e) as being anticipated by Yang et. al. (6,194,325).

Yang et. al. disclose a process for forming a SAC in a SiO₂ layer used to planarize the surface of a wafer, which is comprised of the following steps.

- A Si₃N₄ layer is conformably coated onto polysilicon lines on the wafer surface.;
- A SiO₂ layer is used to both cover the Si₃N₄ layer as well as to planarize the surface of the wafer.;

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-A patterned photo resist etch mask is used in the etching of an opening in the SiO₂ layer between the polysi lines. (See top of column 2.);

-A plasma which is comprised of a H-bearing gas, a optional O-bearing gas, and a F-substituted hydrocarbon bearing gas is used to selectively etch the SiO₂ layer through the openings in the photo resist etch mask to the underlying Si₃N₄ layer. The H-bearing gas may be any of CHF₃, CH₂F₂, and CH₃F. The O₂ bearing gas may be any of O₂, O₃, CO, CO₂, N₂O, NO₂, NO, etc. The F-substituted hydrocarbon bearing gas may be any of CF₄, C₂F₆, or C₃F₈. The substrate is heated between (10 to 110) C during the rie etching process. A RF biased Si anode, which is located above the substrate during the etching process, is heated to a temperature of 260 in order to scavenge free fluorine in the plasma. This increases the selectivity of the etching of the SiO₂ layer to the underlying Si₃N₄ layer. The plasma is formed using an RF inductively coupled coil, which is wrapped, around the plasma generation chamber. This is discussed in columns 1-12. This is shown in figures 1-2.

6. Claims 63, 75, 82, 89, 91-96, 102-103, 106, 109, and 113-123 are rejected under 35 U.S.C. 102(e) as being anticipated by Marks et. al. (5-19-93')

Marks et. al. disclose a process for etching a SAC in a SiO₂ layer on a surface of a wafer selectively to an underlying Si₃N₄ layer which covers the surface of the wafer as well as polysi lines on the surface of the wafer. They employ a plasma , which is comprised of C₂F₆ or C₃F₈ to selectively etch the SiO₂ layer to the underlying Si₃N₄ layer in an RF inductively coupled plasma etcher. They achieve etch selectivity's of

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(20/1 to 40/1). A heated RF biased Si anode plate which is located above the substrate during the rie etching step is used to increase the selectivity of the etching of the SiO₂ layer to the underlying Si₃N₄ layer. This is discussed on pages 190-200.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 36-37, and 43-123 are rejected under 35 U.S.C. 103(a) as being unpatentable over the reference as applied in paragraph 5 above.

The reference as applied in paragraph 5 above fail to disclose the following aspects of applicant's claimed invention:

- the specific etch process parameters which are claimed by the applicant; and
- the usage of an inert gas as a diluent in the plasma etchant employed in the rie etching process taught above

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It would have been obvious to one skilled in the art to employ an inert gas such as Ar in the plasma etchant taught above based upon the following. The usage of an inert gas such as Ar as a diluent in a plasma etchant is conventional or at least well known in the plasma etching arts. (The examiner takes official notice in this regard.) Further, this simply represents the usage of an alternative, and at least equivalent means for conducting the etching process taught above to the specific means, which are taught above.

It would have been prima facie obvious to employ any of a variety of different etch process parameters in the etching process taught above including those which are specifically claimed by the applicant. It would have been prima facie obvious to employ any of a variety of different etch processing parameters in the etching/ cleaning/ conditioning processes which are taught above including those which are specifically claimed by the applicant. These are all well known variables in the plasma etching art, which are known to affect both the rate and quality of the plasma etching process. Further, the selection of particular values for these variables would not necessitate any undo experimentation, which would be indicative of a showing of unexpected results.

Alternatively, it would have been obvious to one skilled in the art to employ the specific etch process parameters which are claimed by the applicant based upon *In re Aller* as cited below.

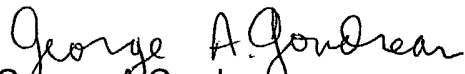
"Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F. 2d 454, 105 USPQ 233, 235 (CCPA).

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Further, all of the specific process parameters, which are claimed by the applicant, are results effective variables whose values are known to the effect both the rate, and the quality of the plasma etching process.

10. Any inquiry concerning this communication should be directed to examiner

George A Goudreau at telephone number 571-272-1434.


George A Goudreau
Primary Examiner
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